REMARKS

Favorable consideration and allowance of the claims of the present application are respectfully requested.

In the present Official Action, the Examiner first rejected the Claims 1, 2, 4 and 7-9 under 35 U.S.C. §102(e) as allegedly being anticipated by Xiang (U.S. Patent No. 6,849,527)("Xiang") as allegedly teaching and describing the invention. The Examiner further rejected Claims 5 and 6 as allegedly unpatentable over Xiang in view of Noda et al. (U.S. Patent No.6,432,802) ("Noda").

With respect to the rejection of independent Claim 1, as allegedly being anticipated by Xiang, applicants respectfully disagree for the following reasons:

1) There is actually no teaching or suggestion in Xiang that one or more dislocation or crystal defects extend continuously from the source region to the drain region at an interface between said first strained layer of semiconductor material and said substrate. While Xiang acknowledges the presence of misfit dislocations between the strained Silicon layer and supporting SiGe layer (Xiang at Col. 2, lines 15- 31), Xiang describes this in the context of the critical thickness of the strained Silicon layer that the underlying SiGe layer can support without risking significant number of misfit dislocations. Xiang makes no mention that the misfit locations extend continuously from the source region to the drain region.

2) Moreover, Xiang does not recognize nor makes mention that, after a drain/source region annealing process, the misfit locations that extend continuously from the source region to the drain region provide a leakage path from the drain to the source (a process-induced

dislocation leakage path) whereby dopant atoms diffuse or segregate along the disclocation and join together to form a leakage path if the gate length is sufficiently short.

3) The present invention, addresses the process-induced dislocation leakage path problem whereby dopant atoms diffuse or segregate along the disclocations if the gate length is sufficiently short resulting in one or more of: poor turn-off behavior, high leakage in the subthreshold region (Vgs <0) and other dislocation-related failures.

4) The solution of the invention as claimed in Claim 1 is to provide blocking impurity dopant materials that partially or fully occupies each said one or more dislocation or crystal defects, such that the blocking impurity dopant materials substantially inhibit diffusion of said implanted source and drain dopants from diffusing along said dislocation or crystal defect as required by Claim 1 of the present invention.

5) Applicants find no teaching or suggestion in Xiang that the carbon atoms implanted into the active region of the strained Silicon layer of the MOS device partially or fully occupy each said one or more dislocation or crystal defects to substantially inhibit diffusion of implanted source and drain dopants from diffusing along the dislocation or crystal defect as required by Claim 1 of the present invention.

6) Xiang actually teaches implanting carbon atoms into the active region of the strained Silicon layer of the MOS device for purposes of forming a silicon carbon alloy having a greater carrier mobility than that of an undoped Strained silicon layer (Xiang at paragraph bridging columns 4 and 5). That is, the MOS active device region is implanted with carbon atoms for purposes of raising the effective strain induced at the strained silicon layer than would be normally imparted by the concentration of Ge in the underlying SiGe layer. Xiang describes a concentration of about 1% carbon introduced into the strained silicon

layer to effectively increase the strain (and hence, carrier mobility) of the strained silicon layer. As such, it can only be deduced that the carbon atom implantation in this layer are diffused throughout the strained layer to provide said enhanced mobility with the energy and dose of the implanted carbon selected to achieve the desired strain increase.

7) Thus, Xiang addresses a different problem than the problem addressed by the present invention. In Xiang, the carbon doping technique described primarily addresses the carrier mobility mismatch problem present in both PMOS and NMOS devices formed of the same strained silicon layer. That is, the focus in Xiang is to perform the carbon doping technique in PMOS devices according to conventional CMOS processing techniques wherein the end-result achieved is provide the approximate same carrier mobility in both PMOS and NMOS devices formed in the same strained silicon layer. (See Xiang, Col. 3, lines 41-45 and, paragraph bridging line Col. 6 and Col. 7).

8) Xiang's doping of carbon atoms in the strained Si layer is not suggestive that the implanted carbon atoms as provided in Xiang would inherently partially or fully occupy each said one or more dislocation or crystal defects to provide the same function as claimed in the present invention. In fact, Xiang teaches away the use of blocking impurity dopant materials that partially or fully occupies each said one or more dislocation or crystal defects to inhibit diffusion of source/ drain materials in the leakage path. Rather, Xiang explicitly teaches employing additional "halo regions" to counteract undesirable diffusion as acknowledged by the Examiner in his 103(a) rejection of Claims 5 and 6 which is a completely different than the technique provided by applicants' invention (See Xiang, Col. 7, lines 35-38). Thus, Xiang does not address providing blocking impurity dopant materials to partially or fully occupy each said one or more dislocation or crystal defects to substantially inhibit diffusion of

implanted source and drain dopants from diffusing along said dislocation or crystal defect, as provided by the solution of the present invention. Applicants, on the other hand, distinctly disclose that the blocking impurity is implanted with an energy such that the peak blocking impurity concentration approximately coincides with a Si/SiGe interface (See paragraph [0025] of present application).

For these reasons, it is respectfully submitted that Xiang whether taken alone or in combination with the cited reference to Noda does not teach nor is suggestive of the present invention as claimed in Claim 1. Accordingly, the Examiner is respectfully requested to withdraw the rejection of Claim 1 and remaining dependent Claims 2 and 4-9 as being anticipated by Xiang under 35 U.S.C. §102(e).

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance be issued. If the Examiner believes that a telephone conference with the Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned, Applicants' attorney, at the following telephone number: (516) 742-4343.

Respectfully submitted,

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